INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) ASSESSMENT FOR USAID/MACEDONIA IN PREPARATION FOR USAID GRADUATION

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Executive Summary

This ICT (information and communications technology) assessment responds to a request by USAID/Macedonia to provide the mission with a clear understanding of the priority areas for action related to ICT that the mission can undertake prior to Macedonia's graduation from USAID assistance – to help Macedonia be in the best position possible as a prosperous, democratic and competitive nation.

I. Telecommunications Legal, Regulatory and Policy Environment

2005 was a bellwether year for Macedonia's telecommunications policy environment. Parliament passed a new telecommunications law, which establishes the legal foundation for a competitive, innovative telecommunications sector. A multi-stakeholder Committee for Information Technology drafted a national information society strategy and action plan. Although these events provide much cause for optimism, there is also significant risk. The government must now take important next steps, e.g., establish a regulatory agency and formulate new bylaws, and take a leadership role in implementing information society plans. Yet the government's stake in the incumbent (recently monopoly) telecommunications provider, provides countervailing pressures against multi-donor advocacy for progress (in which USAID has played a lead role), the lure of EU accession, and demands from business and university communities for change.

To assist the Government of Macedonia and its people to take the necessary next steps in improving the telecommunication policy and regulatory environment, USAID/Macedonia may want to consider the following actions:

1. Use systematic, persistent efforts – along with monitoring and evaluation measures - to ensure that the new law and related regulations are implemented as intended to promote open competition.
2. Work closely with other donors to promote successful implementation of the law and of appropriate Information Society plans.
3. Provide capacity-building for a new regulatory agency.

II. ICT Access and Applications

A. Access and Cross-Sector Opportunities

Voice telephony services are pervasive throughout Macedonia, with over 89 percent of households having telephones[1] through the fixed line provider, Macedonia Telecomm (Maktel) and/or one of the two mobile phone operators. Despite modern fixed line infrastructure,

[1] Appendix B, reference 1, p. 3.

phone service is expensive. However, if the new law is implemented properly, inexpensive VOIP service is likely to become widespread quickly.

Access to computers is quite impressive, with some 27 percent of Macedonians having computers at home.[2] Unfortunately, fewer than 10 percent of Macedonian households currently have Internet access,[3] primarily due to the high cost of even dial-up services. However, a major increase in Internet access is about to occur with USAID's *Macedonia Connects* project, which will make broadband available nationwide before the end of the year.

That national broadband network can help Macedonia take a quantum leap forward in using ICT to improve performance across all sectors. To assist Macedonia in taking full advantage of the national broadband network, USAID may want to consider the following activity, which would cut across all sectors and strategic objectives:

1. Create a network of "e-Opportunity Centers" across Macedonia, in partnership with businesses and entrepreneurs who co-invest in and own the centers, which would use ICT to provide access to information, training and technical assistance in every sector, e.g.:

    - information on business and job opportunities within Macedonia, the region, and the world; career counseling based on trends internationally and domestically
    - online training (complemented as appropriate with face-to-face training), e-coaching and e-mentoring
    - access to educational software, e-tools and applications, along with quality ratings
    - access to e-government software applications, with cases drawn from other local government users
    - information for government, e.g., on skills standards and workforce development trends

B. ICT and Economic Growth

Persistent high unemployment of 37 percent makes job generation Macedonia's top economic priority. As most businesses are small or medium enterprises (SMEs), fostering use of ICT to improve SME competitiveness is key to economic progress. Although many SMEs appear to have computers, few have Internet access. There is a vibrant IT business sector, but IT firms complain that they cannot find employees with the technical skills they need to be competitive in the international market. Companies in other sectors have similar difficulties finding skilled labor. The public sector is the major source of revenue for IT firms, although some companies are building a private sector customer base.

USAID activities have been at the forefront of donor efforts to use ICT to promote SME competitiveness. The collaborative efforts of two projects have created a powerful, innovative approach to fostering business competitiveness. The Macedonia Competitiveness Activity (MCA) is providing training and technical assistance to strengthen the IT sector. The e-Biz Project co-invests with local entrepreneurs to create e-BIZ Centers, which offer high

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[2] Appendix B, references 1, p. 3. Reference 3 reports 29 percent of 12 to 45 year olds use computers at home.

[3] No accurate statistic is available although no one disagrees that Internet penetration is low. USAID sponsored a 2004 survey of 12 to 45 year olds. Of this age bracket, 15 percent reported having Internet access from home. (Reference 1, p. 9.)

impact ICT applications that can quickly improve competitiveness of SMEs in entire clusters or industries.

To further promote use of ICT to foster economic growth, USAID/Macedonia may want to consider the following actions:

1. Building on the successes of e-BIZ and MCA, link those initiatives more closely, to expand their breadth (into new sectors, including agriculture) and depth (to rural areas).
2. Use ICT to support development of a modern, competitive workforce.
3. Ensure transparent government procurement to support development of ICT offerings in which Macedonia can have a competitive edge, and to attract foreign direct investment.
4. Encourage the Government of Macedonia to support initiatives that use ICT to build export capacity, attract FDI, and generate jobs.
5. Use ICT to build broad-based business management skills.

C. ICT and Education

Primary and secondary education in Macedonia suffer from large student populations, fraying infrastructure, tight budgets, rigid/outdated curricula, lack of modern teaching methods, limited use of IT, and inefficient administration. Universities also struggle with outdated courses and poor links with the business community.

Nonetheless, there are strengths. Ninety-six percent of children complete primary school. Literacy rates are high. Some secondary schools have room to innovate. There is growing recognition of the importance of modern ICT skills. Thanks to USAID programs, there has been dramatic progress in several areas: almost all schools now (or will soon) have computer labs, there is growing capacity for teachers to use ICT as part of modern teaching methods, and students in vocational education schools are learning business skills. At the university level, several departments have modern ICT labs, and innovation is emerging with "e-Business" programs and introduction of management skills in engineering programs.

To assist the education system to continue its progress and build on the achievements already realized by USAID programs, USAID/Macedonia may want to consider the following actions:

1. Improve links between education and the business community.
2. Support access to and effective use of ICT applications (including open source software) for active learning and development of local content.
3. Link faculty of primary, secondary and post-secondary schools with their peers in Macedonia and in other parts of the world.
4. Link students across ethnic groups and borders.
5. Use ICT to improve school administration and management.

D. ICT and Government

At the national level, ICT adoption in ministries has lacked a comprehensive strategic plan. The situation may soon improve, as momentum builds for adoption of a national ICT or information society strategy, which will undoubtedly track against the EU's eGovernment

indicators for benchmarking eEurope.[4] Decentralization policies, along with restructuring of local governments – significantly reducing the number of municipalities – and recent municipal elections, have created major shifts in the local government landscape. Many of the recently elected mayors are new, providing valuable opportunities for innovation, including adoption of e-government applications to improve efficiency, responsiveness and transparency.

Recognizing the opportunities – and risks – inherent in decentralization, several donors are conducting major efforts to support the process, often including use of ICT to improve local government performance and increase citizen engagement in local government decision-making. USAID programs have played a leadership role. These activities are helping government use ICT applications to improve transparency and efficiency of a range of processes including procurement, budget and finance operations, urban planning and permitting processes, and tax reform. They are also promoting effective use of ICT to improve the efficiency and performance of the Macedonian judiciary system.

To build on progress being made in strengthening democracy and improving governance, USAID/Macedonia may want to consider the following actions:

1. Strengthen ability of local governments to use ICT effectively to improve "customer-oriented" responsiveness, transparency, efficiency.
2. Provide incentives (e.g., competitions) that encourage local governments to initiate innovative ICT applications
3. Foster links between local governments and both the IT business community and the education community.
4. Help build access to a critical mass of good quality e-government applications.
5. Work with other donors to encourage national-local government networks in key application areas.

[4] For much more information on eEurope, see http://europa.eu.int/information_society/eeurope/2005/index_en.htm

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I. GOAL, OBJECTIVES AND APPROACH

This ICT assessment was requested by USAID/Macedonia to provide the mission with a clear understanding of the priority areas for action related to ICT that the mission could undertake prior to Macedonia's graduation from USAID assistance – to help Macedonia be in the best position possible as a prosperous, democratic and competitive nation. At this time, USAID graduation is anticipated in or soon after 2010. Macedonia is now in the first steps of the process toward accession into the European Union (EU). No firm date for accession is set yet but it is anticipated to be sometime after 2010.

The objectives of the assessment were as follows:

1. Assess access to and applications of ICT in Macedonia in the public and private sectors and civil society related to USAID strategic objectives (SO).

2. Identify priority areas and types of actions that will build on and strengthen past activities of USAID and other key actors in public and private sectors, exploit opportunities, address gaps, and create synergies, in order to maximize the impact of USAID activities.

3. Identify actions needed to develop a competitive, innovative telecommunications sector, including Internet access, data and voice communications, the convergence of technologies, as well as foster awareness of and, where appropriate, effective adoption of new technologies.

The assessment was conducted in Macedonia April 4 to 15, 2005 (after a desk review of relevant documents) by Judy Payne (USAID/EGAT/EIT/IT) (jpayne@usaid.gov) and Janice Brodman (EDC) (jbrodman@edc.org) with assistance from a virtual team in USAID/EGAT/EIT/IT. The team conducted numerous interviews with USAID staff, businesses, educators, NGOs, government officials, various USAID development project teams, and other donors (Appendix A) and reviewed many documents (key ones are listed in Appendix B).

The assessment team used a two-pronged approach: a SWOT analysis (identifying Macedonia's strengths, weaknesses, opportunities, threats regarding the use of ICT for prosperity, competitiveness and democratic governance) and a "vision" exercise in which interviewees were asked to describe key features of the conditions they hoped Macedonia would achieve by 2010. Throughout the analysis, the team considered ICT as a means to an end – not an end in itself.

This summary report is organized as follows:

- The following section describes ICT in Macedonia today: the telecommunications legal and regulatory environment; ICT access; and ICT applications. The ICT applications are described in sub-sections for business, education, and government.
- Section III describes the results of the SWOT analysis and vision exercise across sectors.
- The final section, IV, provides ICT-related recommendations resulting from the analysis.

II. ICT IN MACEDONIA TODAY

Because the first three documents listed in Appendix B provide a current overview of ICT access and usage in Macedonia today, this section provides only a brief summary.[5]

A. Telecommunications Legal, Regulatory and Policy Environment

In February 2005, Macedonia took a significant step and passed a new telecommunications law, which is essentially compliant with EU requirements and establishes the legal foundation for a competitive, transparent telecommunications sector with room for innovation. In order for the law to have its intended impact, further steps are needed: a regulatory agency must be established and regulatory commissioners appointed; some 24 (or more) different by-laws are needed and procedures developed and implemented. In addition, the government must renegotiate its contracts with the three major telecommunications providers: Maktel, MobiMak and Cosmofon. All of these steps hold considerable risk. If they are done well – commissioners are skilled and unbiased, by-laws are properly conceived, new contracts are well formulated -- the result will create a telecommunications sector that is a cornerstone for a competitive economy, ensuring open competition, fair pricing for interconnectivity and access to essential infrastructure, and a fair and transparent regulatory environment. Yet delays in the process are already building concerns that elected officials will procrastinate, blocking progress.

In another significant step, the Committee for Information Technology (KIT) conducted a multi-stakeholder process to formulate a national strategy policy, action plan, and implementation plan for an information society. The Committee, led by a parliamentarian and supported by UNDP and FOSIM (Foundation for Open Society Institute Macedonia), used a Task Force of public and private sector leaders to address every aspect of promoting an e-society. The resulting policy and action plan recommend a regulatory environment that supports "the rapid implementation of new technologies."[6] It is worth noting that there is considerable competition between KIT and the Ministry of Transportation and Communications (MOTC), as KIT is far more open and inclusive, while MOTC has formal power. Moreover, the information society plan calls for creation of a new agency that will be responsible for developing Macedonia as an "information society," thereby assuming authority over areas currently under the domain of the MOTC.

The new law and Information Society strategy are noteworthy, but major challenges remain. The law is a prerequisite for a competitive, transparent and fairly regulated telecommunications environment but does not ensure it. Political will is essential to taking the essential next steps. Yet the government owns 49 percent of Macedonia Telecom (Maktel), the incumbent provider, while Maktel accounts for some 12 to 15 percent of the

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[5] For the reader unfamiliar with Macedonia, the country is small (slightly larger than Vermont) with a population of 2 million, 600,000 of whom live in Skopje and some 100,000 more in the next four largest cities. Unemployment is high (36+ percent) and persistent. Its economy is small (GDP of about $4.6 billion; per capita $2,192) with high literacy (95 percent). Most people speak Macedonian (70 percent) or Albanian (21 percent). Until 1991 when Macedonia became independent, Macedonia was one of the republics of the Socialist Federal Republic of Yugoslavia. See for more background: http://www.state.gov/r/pa/ei/bgn/26759.htm

[6] See Appendix B, reference 2, page 11. The data have not yet been analyzed to stratify these results by location – e.g., Skopje versus other cities versus outside of cities) although the raw data do contain such information.

country's GDP[7]. Thus, there are strong disincentives for the government to reduce Maktel's dominance and foster competition. Longstanding conditions undermining transparency -- Macedonia ranked 97th on Transparency International's 2004 Corruption Perceptions Index[8] -- further undermine the political will needed for change.

On another front, there are significant challenges to enforcement of intellectual property (IP) laws. Software piracy is widespread, even among businesses and government agencies. As the government presses to reduce piracy, in compliance with the requirements of EU accession, the cost of software will increase substantially as many firms are pressed to pay license fees they have been avoiding) both for businesses and individuals, which may discourage some IT use. However, broader awareness and use of open source software could attenuate any negative affects.

To address widespread software piracy, Microsoft signed an agreement with the Government of Macedonia (GOM) in 2003, in which Microsoft agreed to develop Macedonian language packs for Windows XP and Office XP software; allow the government to purchase 6,200 software licenses at significant discounts; donate desktop software to many schools and academic environments; and help develop e-government services and "high-impact IT projects" by assigning a full time enterprise strategy consultant and making an annual financial donation for the 4 year term of the agreement. In exchange, the Government agreed to legislative and enforcement compliance with EU, WTO, and GATT guidelines regarding intellectual property; commit to ensure valid licenses for all Microsoft software used in public institutions. Partially due to this agreement, Macedonia now has in place a *Law on Data in Electronic Form and Electronic Signature*. Unfortunately, this law will have to be revised to comply with related EU directives.

USAID Activities Related to Telecommunications Environment. USAID played a critical role in helping to draft the new telecommunications law and reviewing proposed amendments. Coordinating with other donors (European Agency for Reconstruction and GTZ), USAID project team's will offer technical assistance (e.g., training, expert advice) to the new regulatory agency over the next critical months. USAID (IMPACT Project) is also providing legal assistance regarding necessary amendments to the current digital signature law.

B. Access to ICT

Access to Telephony and Computers. Most Macedonians have access to voice telephony services. According to a survey in 2003, over 89 percent of Macedonia households have telephones[9]. Macedonia has one fixed public, fully (95 percent) digitized telecommunications network operated by Maktel. This is the most advanced infrastructure in southeastern Europe;[10] nonetheless, telephony is expensive and of poor quality. Macedonia has two mobile phone operators: MobiMak -- a subsidiary of Maktel -- and Cosmofon. It is notable that there are more mobile phone users (approximately 800,000) than fixed line phone users (approximately 600,000) as of June 30, 2004[11].

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[7] Appendix B, reference 7, page 13, attributed to Jani Makraduli, Macedonian Parliament, IT Committee.

[8] http://www.transparency.org/cpi/2004/cpi2004.en.html#cpi2004

[9] Appendix B, reference 1, p. 3.

[10] Appendix B, reference 8, p. 12.

[11] Appendix B, reference 2, p. 10.

With the new law, the landscape for telephony is likely to change. Even now, a local company, OnNet, is planning to offer low-cost VOIP service for international calls[12]. In combination with the USAID Macedonia Connect project, which will make broadband accessible nationwide, there is likely to be widespread access to low-cost telephony for both domestic and international calls. If telephony quality can be improved -- and barring government actions to prevent VOIP and prolong the telecomm monopoly position -- Macedonia will have telephony services it needs to support economic growth, a modern education system, and e-government applications.

Access to computers is far less pervasive than telephony but nonetheless quite impressive. Some 27 percent of Macedonians reported having computers at home.[13] (Unfortunately we do not have an analysis of the survey data stratified by location.) Relatively inexpensive computers ($400) can be purchased through a 36 month payment plan, making them affordable to many Macedonians; however, it is unclear whether the program is available outside Skopje and/or the major cities.[14]

Software piracy is widespread and two thirds of those recently surveyed reported that that insufficient knowledge of English was a handicap for using computers as well as the Internet.[15]

Access to the Internet. The country's population of some 2 million people is served by at least nine Internet Service Providers (ISPs); 65 firms have cable concession contracts (most of which do not seem to be active) that also allow the provision of Internet access. New ISPs need only register with the government, making it easy for new contenders to enter the market.

Despite the large number of providers, fewer than 10 percent of Macedonian households have Internet access.[16] Of those with Internet access, most have dial-up services, not broadband access. Even dial-up costs are relatively prohibitive with over half of recently polled citizens considering it "expensive."[17]

Although most Macedonians do not have Internet access from home, 30 percent report using the Internet.[18] Only 15 percent of those between 12 and 45 years old reported using it from home and 46 percent reported having to go over 10 minutes to get Internet access, most going to cyber cafes.[19] In the same survey, those using the Internet most often reported using it for fun and games (25 percent) or to get information (19 percent) or personal email (18

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[12] The launch was expected in mid-April, soon after the authors left Macedonia. Given the current uncertainties of the law, OnNet has positioned the VOIP service as a "pilot test."

[13] Appendix B, references 1, p. 3. Reference 3 reports 29 percent of 12 to 45 year olds use computers at home.

[14] This information is based on interviews; authors were not able to talk with companies offering the program to confirm the precise features of the program.

[15] Appendix B, reference 1, pp. 10, 15-16. Note that according to

[16] No accurate statistic is available although no one disagrees that Internet penetration is low. USAID sponsored a 2004 survey of 12 to 45 year olds. Of this age bracket, 15 percent reported having Internet access from home. (Reference 1, p. 9.)

[17] Appendix B, reference 1, p. 9.

[18] Appendix B, reference 1, p. 13. Reference 3 (p. 3) reports that 40 percent of 12 to 45 year olds reported using the Internet in 2004.

[19] Appendix B, reference 3, p. 23. This would mean that 6 percent (15 percent of 40 percent) of this age group actually have internet access from home

percent) and only 9 percent reported using it for work. The few that did report using the Internet for work primarily used it for research and information (33 and 24 percent); very few reported using it for email to customers (9 percent).

USAID Activities Related to ICT Access. USAID is currently helping to increase Internet access via its *Macedonia Connects* project, which will provide broadband Internet access to some 360 schools across Macedonia for two years via a private provider now being selected in a tender process. The selected provider will be obliged to use the telecommunications infrastructure it will provide to the schools to offer reasonably priced Internet access to local businesses, government agencies and households in the surrounding communities.

C. Use of ICT by Business

There are some 33,000 active enterprises in Macedonia employing about 290,000 people. Most (98 percent) are small or medium sized companies.[20] Unemployment is persistently high at about 37 percent. No detailed statistics are available regarding the use of computers and Internet access among businesses (although the survey of individuals cited above suggests that it is very low.) It appears that many businesses use computers – but *without* Internet access. Indeed, in 2004, some 69 percent Macedonians between 12 and 45 years old reported that they use computers (without Internet access) in their daily work.[21]

A brief review of the use of ICT by businesses suggests that the 10 largest companies and the telecommunications companies themselves account for more than half of ICT usage by business in Macedonia.[22] It is difficult to estimate usage by small and medium enterprises because they are more likely to purchase computers and software on the gray market. We have no data on the software applications these businesses use but presume it is basic office applications (word processing, spreadsheets, and presentation software) and perhaps financial accounting software.

Macedonia's IT sector itself includes about 250 companies with 2 to 50 employees. The industry association, Macedonian Association of Information Technology (MASIT) has about 50 members. Most IT companies in Macedonia resell hardware or provide fairly low margin services and solutions in the Macedonian market or to Kosovo and Serbia. The country's IT sector does include perhaps two dozen firms providing more advanced software development and outsourcing services.

The draft national information society mentioned earlier emphasizes the importance of introducing ICT to more Macedonian businesses. For example, it sets a high priority on creating standard electronic formats for basic business transactions for Macedonian companies to use, as well as demonstrating how firms can change their business processes to take advantage of "e-business" techniques and training businesses to do so.

It is worth noting that the public sector constitutes the major source of revenue for IT firms. Reduction in IT spending by government during the past few years has left many IT companies scrambling to stay alive. A number of firms have moved determinedly to build their private

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[20] Appendix B, reference 2, p. 18.

[21] Appendix B, reference 3, p. 19.

[22] Appendix B, reference 8, p. 15, 16.

sector customer base, some with the help of the USAID MCA project. Nonetheless, most IT companies appear to continue to rely heavily on government and donor project demand.

USAID Activities Related to ICT in Business. USAID has been at the forefront of initiatives to encourage effective use of ICT to foster economic growth. There are two major USAID activities directly related to ICT in Business: MCA and the e-Biz Project. These projects work closely together in certain sectors.

Macedonia Competitiveness Activity (MCA) is helping to strengthen the IT sector through a variety of activities, including assistance with a marketing strategy and demand-generation programs in IT services outsourcing and film FX (special effects) and animation outsourcing. It has also helped developed two consortia of IT firms and helped establish training for software animators in Macedonia secondary schools (3D@eSchools). It has provided grants and expert volunteer resources to six companies which have resulted in good commercial prospects and it helped form an e-government task force of 17 IT companies. The task force has been recognized by the national information society strategy process and has provided comments on the strategy, which includes a significant e-government component. In 2005, it will continue to support the sector with an variety of activities, including conducting professional training in product marketing and sales and help the IT cluster it works with figure out how to continue its activities after the end of the MCA project in 2006.

The e-Biz Project focuses on creating jobs through strategic high impact ICT applications. The project identifies high impact ICT applications that will quickly improve competitiveness of SMEs (small and medium enterprises) in entire clusters or industries, then works with a SME to create a commercially sustainable "e-BIZ Center," based on the new ICT service. The project provides "seed capital," which is matched by the e-BIZ local partner investment, along with intensive technical assistance. For the apparel manufacturing and tourism clusters, e-BIZ works closely with MCA -- e-BIZ providing high impact ICT applications via e-BIZ Centers, along with some sales and marketing support, and MCA providing extensive business development support. The e-BIZ project has created seven e-BIZ Centers:

- Tourism Portal -- helps the entire tourism industry be more internationally marketable
- Apparel Technology Center -- provides CAD/CAM services to apparel companies
- Shoe Technology Center -- provides CAD/CAM services to shoe companies
- Online Management Training Center -- offers high quality training via the Internet
- Fashion Industry Portal -- provides e-commerce services to the fashion industry
- Java Lab -- provides engineering companies with new international market opportunities
- SEEU e-BIZ Center -- provides fee-based ICT-related services to local companies.

D. Use of ICT in Education

The overall picture of primary education in Macedonia is daunting: large student populations, fraying infrastructure, extremely tight budgets (primarily dedicated to salaries), rigid curricula, lack of modern teaching methods, limited use of IT – and then only to teach informatics beginning in fifth grade. Recent momentum on government decentralization is likely to exacerbate the problems, as administrators and teachers begin to take on new administrative and financial responsibilities. The recent restructuring of municipalities –

reducing the number from 124 to 84 – may also lead to difficulties, as municipal governments struggle to ensure that education facilities are adequate for the population now within their borders.

Nonetheless, primary education in Macedonia has strengths: enrollment is high (96 percent) among both genders (although Roma communities are said to remove many girls from school at an early age) and basic literacy rates are strong. Although USAID projects (described below) have taken a leadership role in advancing the use of ICT to modernize education, a range of other donors projects (e.g., the PHARE program; Soros projects) have introduced some teachers to modern teaching methods, developed some new curricula, and equipped some schools with computer labs. A UNICEF non-formal education project established local Youth Centers that offer training in computer skills, and English language to out-of-school youth and adults.

The picture for secondary schools is grim: huge student bodies (up to 2,000 - 3,000 students/school); densely crowded classrooms and double (even triple) shifts; deteriorating facilities; teachers with little in-service or pre-service training in active learning methods, severely strained budgets (again earmarked largely for salaries), almost nonexistent links between schools and the business community, no widely recognized standards for the kinds of ICT skills students should have before graduation. Directors (principals) are politically appointed and often lack pedagogical training. The Bureau for Development of Education (BDE), which controls curricula, is slow to introduce change. The BDE currently has not a single staff person responsible for curricula related to information technology, including informatics and the use of IT within other courses. Although all secondary schools have some computers and nominally offer informatics, most of the curricula and teachers' skills are antiquated, Internet access is rare, and computers are often kept behind locked doors "for the sake of security."

Again, the picture is not entirely bleak. There appears to be growing recognition in the education system that more modern ICT skills are needed and schools need to be more effective in preparing students for work. Some vocational education and training schools (VETs) run their own enterprises and have room to innovate (although the curricula are controlled by BDE). Again, USAID projects have led much of this progress.

The situation for post-secondary education is more promising than for secondary, although the system suffers from many similar problems: outdated courses, poor links with the business community, limited links between universities within Macedonia or with schools in other countries. On the positive side, SEEU, due largely to USAID assistance, is gaining a reputation for more innovation and relevant courses than the other schools, which is helping motivate other universities to innovate as well (this could eventually have positive implications for the quality of secondary school teachers.) Pressures are coming from students, who want courses that will prepare them for good jobs. There are a number of ICT labs in the universities, both in engineering and non-engineering departments. and faculty leaders, e.g., in the Informatics faculty, use the Internet as part of courses (e.g., to provide materials, give tests). The three year old "e-Business" undergraduate program in the Faculty of Economics at St. Cyril and the efforts to introduce business and marketing topics and business projects into the IT curriculum in the Faculty of Natural Sciences (Institute for Informatics) are also welcome examples of what the universities can achieve.

The one area of post-secondary education that is quite weak involves non-formal education and lifelong learning. Macedonians are largely unused to thinking of skills development as an

ongoing process. There are limited opportunities to obtain high quality training after graduation from school. Programs that do exist have no body of standards that informs the public of the level of quality.

USAID Activities Related to ICT in Education. Despite the obstacles, there is considerable reason for optimism for effective use of ICT across the education system. The USAID education projects with ICT as a major component have provided significant leadership and appear to have generated excitement and interest among teachers, students – and even many school Directors – thus creating opportunities for large-scale change. These projects:

- Are installing computer labs, each with 20 computers, in all 100 secondary school; and labs, each with 5-15 computers, in all 360 primary schools; training a cadre of teachers in the use of ICT to support active learning, who are to train other teachers; creating an online resource portal for teachers (e-Schools)

- Are training 4,000 elementary school teachers in the basics of using computers (Basic IT Skills Training Activity)

- Will provide broadband connectivity to all primary and secondary schools, as well as universities, while raising awareness nationwide regarding the opportunities ICT offers (Macedonia Connects)

- Are strengthening practical knowledge of business among students of 50 vocational education schools (VETs) by helping students create functioning businesses in the VETs and simulated firms in economic schools; creating career centers that help prepare students for the job application process (Secondary Education Activity)

- Have promoted modern teaching methods, established media labs with computers and connectivity, and facilitated a network of innovative teachers in 18 (of 100) secondary and 45 (of 320) primary schools; will introduce modern teaching methods, including use of ICT to promote active learning, into the teacher training institutes that produce teachers for grades 1-4 (Creative Teaching and Learning Project). The project intends to extend this effort to reach at least some teachers of grades 5 – 12.

- Are helping build South East European University into a high quality, multi-ethnic university with modern ICT facilitated including a computer center, broadband connectivity, a video conference center; focusing on building capacity among business administration, computer science and technology faculties (South East European University Project)

Nonetheless, persistent education gaps are still evident:

- Although the World Bank's Education Modernization Project is creating an education management information system in the Ministry of Education and Science, and intends for all schools to collect data and submit the data electronically, all schools lack computer-based administration applications needed to track students

- Business complain that school graduates lack useful skills, while high unemployment persists including among the "educated unemployed," i.e., those with university degrees in a range of fields.

- Decentralization is likely to exacerbate the education resource scarcity problem. Teachers who are expected to disseminate new "ICT for active learning" methods are already over-extended and under-compensated. Municipalities with a dearth of human and financial resources will be expected to take responsibility for local schools within the next few years, including covering the costs of Internet access and computer maintenance.

- Teachers of grades 5-12 have no early prospect of receiving training in modern teaching methods, including the use of ICT to promote active learning.

- Curricula are antiquated and the BDE, which controls curricula, lack vision and motivation for change, or rewards for those who endeavor to change.

- Faculty in the entire school system, from primary through university level, are largely isolated from their peers in other counties, especially those that can help promote effective use of ICT in teaching and learning.

E. Use of ICT by Government

Although individual ministries at the national level have begun using ICT in various ways – large and small -- there is neither a common approach nor a strategic plan. The draft national strategy for information society (not yet presented to the Prime Minister as of the end of April 2005) calls for a national strategy for e-government; sets goals for e-services to citizens and business, e.g., on-line transaction processing; and identifies several benefits of adoption of ICT by government in Macedonia. It sets a high priority (among many other e-government projects) on developing an Internet portal for the government and defining standards and architecture for e-government applications.

In parallel, the newly passed telecommunications law requires the Minister of Transport and Communications to prepare "the national strategy for development of electronic communications and information technology taking into account the strategy for development of the information society in Macedonia." Thus, it appears that these two planning processes are likely to coincide to produce an ICT strategy for government sooner than later. Whatever national ICT or information society strategy is agreed upon, the country's progress related to e-government will most likely closely adhere to the EU's eEurope action plan and track against the EU's eGovernment indicators for benchmarking eEurope.[23] This is good news, given the eEurope processes and benchmarks seem to be well conceived.

As mentioned above, Macedonia's local governments have just been restructured, based on the Ohrid Framework Agreement signed in August, 2001, to bring an end to a violent conflict between ethnic Albanians and ethnic Macedonians in Macedonia. Elections were held in early 2005 to elect mayors of the newly defined 84 municipalities, and the national government will move ahead on decentralization of various financial and service functions to these municipalities. A large proportion (80 percent) of mayors is new, creating a "green field" for e-government applications in many of these municipalities.

Several donors have significant efforts aiming to support the decentralization process. UNDP has a major program on building capacity of local governments and engaging citizens in

[23] For much more information on eEurope, see http://europa.eu.int/information_society/eeurope/2005/index_en.htm

decision-making. Three projects in particular focus on ICT. One conducted an ICT Assessment of municipalities and developed recommendations for an "e-Model of Municipalities" (completed April 2004).[24] A second supports establishment and effective use of a Local Governments Information Network (LOGIN), a clearinghouse that aims to promote professional development of local governments, and strengthen the capabilities of civil society, by facilitating exchange of information via the Internet. It will also help the municipalities link with international networks on local governance issues, obtain on-line information on training opportunities, etc. LOGIN is integrated on the web site of the Association of Local Self-Government Units (ZELS) (www.zels.org.mk). The third project has established 19 ICT Centers to promote use of ICT for information exchange among local governments and their communities, expand markets for SMEs, and – in collaboration with the Foundation Open Society Institute of Macedonia (FOSIM) – strengthen ICT infrastructure and networking of local governments. A UNDP/FOSIM project aims to build capacity in six "model municipalities," and increase citizens' participation in the decision-making process.

The European Agency for Reconstruction (EAR) also expects to focus on supporting decentralization, including providing support to establish citizen "information hubs" in several municipalities, urging the Treasury to extend their information network to municipalities, collaborating closely with the USAID MDW project (see below) to build two applications in pilot municipalities and train local officials in urban planning.

USAID Activities Related to ICT in Government. Again, USAID has played a leadership role in introducing ICT as a tool to improve local government. Three USAID projects currently support e-government initiatives.

1. Making Decentralization Work (MDW) – although not an "e-government" project per se, the project is helping municipalities use ICT to improve budget and finance processes, urban planning and permitting efforts, and tax reform. It has committed limited support to develop e-government applications and provide them to municipalities. Applications include financial management, budgeting and taxation applications, and a planning and permitting application, now being used in 10 pilot municipalities. All of these applications can eventually be linked to other government agencies, e.g., the Treasury and tax office. In addition, the project is helping municipalities buy hardware and software

2. Improve Management and Public Administration through Communications Technologies (IMPACT) – focuses on developing ICT applications for government and building capacity among government units to use ICT effectively and among ICT companies to provide applications. The initial focus is on conducting a pilot to demonstrate the positive impact of ICT, with the use of an e-procurement application by the city of Skopje. The application aims to automate the entire procurement process for specific types of goods and services, thereby improving transparency and efficiency. Subsequent applications may focus on: online application for civil service jobs, digital signatures, and e-tax filing (at the national level)

3. Macedonia Court Modernization Project – aims to strengthen the Macedonian judiciary and improve the efficiency and performance of the Macedonian courts, including helping introduce effective use of ICT for selected areas. One area of focus is on improving an

[24] http://undp.org.mk/e%2Dgovernance/

existing case tracking application so that it is a more useful management tool, installing it in 10 pilot courts, and helping the courts integrate its use in the court processes.

III. SWOT ANALYSIS, VISION

The SWOT analysis of ICT in Macedonia today is summarized below based on the team's interviews and analysis.

A. Strengths

- New telecommunications law promotes a competitive, transparent and innovative environment.
- Formulation of the national strategy for information society engaged stakeholders from all key sectors of society. After the strategy has been formally adopted by the national government, it will both provide a useful guideline and elicit widespread support for its implementation.
- Universities are increasingly endeavoring to work more closely with the private sector.
- Contributions of USAID's programs have been key, especially: e-Schools installation of computers, networks and introductory training for teachers and school directors; Macedonia Connects making broadband accessible nationwide; MCA's strengthening the IT sector and promoting national recognition of the importance of competitiveness; e-BIZ use of ICT to significantly strengthen competitiveness of SMEs in industries key to Macedonia's economic progress; USAID's government-strengthening projects using ICT to improve transparency, efficiency and responsiveness, especially among municipalities.
- Throughout the country, there is growing interest in, and support for, use of modern ICT in all sectors, with potential EU accession providing further incentives

B. Weaknesses

- High unemployment persists.
- Lack of political will to lead "e" direction at national level undermines rapid action to make the telecommunications environment conform to the new law, and to implement a national information society strategy.
- Weak business management and entrepreneurial skills, let alone e-business related skills, hamper strengthening of Macedonian business competitiveness.
- Lack of active learning techniques, as well as ICT-tools and applications to foster these techniques, fail to foster the skills students need to thrive in a modern economy.
- High transaction costs hamper growth and innovation among businesses
- Poor linkages between the education community (especially secondary and university) and the business community result in students who are ill prepared for the world of work.
- Lack of awareness of ICT-based opportunities to solve critical problems reduces opportunities for improvement in virtually every sector.

C. Opportunities

- Widespread, affordable broadband connectivity by the end of 2005, via Macedonia Connects, could enable important innovative initiatives in virtually every sector.
- New telecommunications law could open opportunities for greater competition, resulting improved service at lower prices.
- Decentralization, revision of municipalities, and the recent mayoral elections resulting in 80 percent new mayors have created a "green field" to build upon.
- The national information society strategy, along with growing excitement about and interest in ICT in virtually all sectors of society, can fuel positive change.
- Macedonians see unemployment as the most important national problem so are hungry for ways to become well employed: modern educational and training opportunities; opportunities for high quality commercial training that will lead to jobs; and improvements in education to make substantial contributions to business competitiveness.
- Macedonia's geography can be an advantage: its small size makes it possible to create e-opportunities in every sector throughout the country; its geographic position opens prospects in regional markets, e.g., via Free Trade Agreements with 8 countries that may soon include services.

D. Threats

- To enable a more open and competitive environment, the new telecommunications law requires government action that may not transpire soon…or at all.
- Lack of management skills, along with the imperatives of short-term survival, may impede non-ICT companies' adoption of ICT that would strengthen their competitiveness in the medium-term; meanwhile, lack of marketing skills among ICT companies may undermine their efforts to encourage appropriate ICT use among SMEs.
- Rigidities in the education system -- e.g., in BDE, "old guard" teachers' predominance, limited recruitment of new teachers, lack of incentives for change -- may undermine innovative initiatives to use ICT to modernize teaching methods.
- Poor linkages between education and business communities could prolong antiquated curricula, continuing to produce graduates without relevant ICT (and other) skills, and undercutting efforts to make SMEs more competitive and reduce unemployment.
- Municipalities may be unable to meet the challenges of decentralization, resulting in a decline in living standards, educational facilities including Internet access and computer labs, and economic opportunities.
- Persistent unemployment, along with the pressures of decentralization, could raise tensions among ethnic groups and promote destabilization, which would further undermine economic progress.

E. Vision

The team asked themselves and interviewees to describe their "vision" related to ICT for Macedonia in 2010. Here are some of the responses, showing a world class, "e-savvy" and economically and socially healthy Macedonia. This may be a bit "pie in the sky" but can be useful to see where Macedonia may go.

- Macedonia has taken advantage of its small size to develop an international reputation as an "e-country." Ninety percent of the population takes advantage of low cost, pervasive, broadband Internet access. The country's workforce in the IT sector and beyond is highly regarded for its e-business know-how and adaptability to changes in technology.
- Many sectors of the country's economy compete based on their use of technology – textiles, tourism, agriculture – so 40 percent of workers have increased their wages.
- Macedonians use ID cards with built in e-signature capabilities to tap a wide variety of e-government and business services including e-payments.
- ICT-savvy political leaders in the executive and parliamentary branches of government at the national and local levels use ICT to conduct their work, based on capabilities developed and implemented in a partnership with Macedonia's IT private sector.
- Macedonian young adults are well educated in their schools; confident and optimistic about Macedonia's future; able to step into challenging jobs that build on what they have learned.
- Macedonia's students of all ages from childhood to the elderly depend on an education system – primary, secondary, VET schools and universities -- that uses a mix of modern learning approaches, bolstered by technology where appropriate, in partnerships with learning institutions around the world, and in synch with Macedonia's private sector.
- Cell phone applications are as ubiquitous and powerful as Internet applications – with technological convergence between technologies.
- Plenty of e-content and e-applications in Macedonian, Albanian and Roma to support all of this.
- Broad use of open source as well as proprietary licensed software with Macedonians showing strong respect for intellectual property and protections against cyber crime.

IV. RECOMMENDATIONS

The recommendations below are made for consideration by USAID/Macedonia as it prepares for its next – and probably last – strategic planning process for USAID activities in Macedonia. These recommendations only relate to ICT, not to USAID's overall program and they are based on the assessment team's brief analysis. The team is available for further discussion of any of these recommendations at the mission's convenience.

All of the recommendations are generally consistent with the draft national strategy for information society and action plan. We were not able to review the detailed and prioritized implementation plan.

The first recommendation is a broad one that touches on all aspects of USAID's portfolio today. It is followed by more specific recommendations to consider related to the telecommunications environment and ICT in education, business, and government.

A. Worldwide Opportunity Network

This recommendation goes beyond the scope of an ICT assessment. It would be a bold approach for the mission and, if conducted effectively, would leave a lasting legacy and **concrete benefits** for Macedonians. It builds on the opportunities and strengths identified above and USAID's current programs – as well as the recommendations provided in this report for ICT in government, education, and business. It would also attract innovative private sector partnerships, perhaps with a major bank, a technology firm and/or even a European retailer. It tackles head on the problem that is most worrisome for Macedonians[25]: persistent high unemployment.

The recommendation is to create a Worldwide Opportunity Network[26] for Macedonia that provides Macedonians throughout the country with information on job and business opportunities, as well as access to the know-how, training, coaching, and other resources needed to pursue them. It would use ICT to provide the work and training opportunities currently available in cities -- Skopje, Paris, London, and New York – to everyone in Macedonia.

This recommendation is for a program that would span USAID/Macedonia's strategic objectives. It could be implemented as a single, integrated program or as a few separate but tightly coordinated programs. Either way, each component – education, government, business – should be strongly incented to conduct frequent and regular reviews to ensure they are in close collaboration.[27]

[25]Per on-going public opinion surveys commissioned by USAID/Macedonia, DLG Team.

[26] With a clever name for strong marketing in Macedonian, Albanian and any other languages needed.

[27] This general description will be supplemented with a separate document that provides greater detail describing the concept.

How the Worldwide Opportunity Network Might Work

An unemployed man in a small town in Macedonia goes to a business in town that has a sign showing it is part of the Worldwide Opportunity Network. He watches a series of brief video clips in Macedonian (also available in Albanian and Roma) describing businesses that could be started up in his area – and selects "beekeeper". He finds out there is a demand for bee pollinization by farms in his region because they are growing new types of crops for export.

He can look up a "menu" of the skills he needs to become a beekeeper and opts to take some e-courses. He learns what equipment and other resources (e.g., financing) he will need and how to run his beekeeper service.

At this point, he gets a bit overwhelmed so opts to use an e-coach (or depending on his town there may be one in the flesh that he can get through the center) who uses the phone or videoconferencing to walk through the business aspects of the beekeeper business and how to apply for loans.

After he gets his business started, he checks in regularly with his e-coach to monitor his progress and also joins an e-network of other beekeepers to solve problems. By now, his wife and two sons (who were unemployed) are working with him.

The Worldwide Opportunity Network key features:

- The network aims to create long-term jobs – and whenever possible, higher value-added jobs -- throughout Macedonia – from e-workers to large businesses.
- The network builds solidly on the core education, economic growth and government activities of USAID and others -- no re-inventing the wheel.
- All aspects of the network are built on partnerships with the private sector and entrepreneurs wherever possible – so each part is demand driven and builds on strong business incentives.
- The network rewards innovation and recognizes it publicly.
- The network builds on links between the private sector, education and government within Macedonia and beyond.

The Worldwide Opportunity Network services include:

- Job finding services and access to requisite training, using a mix of ICT-enabled techniques and face-to-face techniques, including Internet based training, video-conferencing, face-to-face and e-coaching; and more.
- Real and reachable business opportunities and the know-how and support to take advantage of them – for a full range of businesses from one-person shops and e-workers to larger businesses; to opportunities in the next town to across borders.
- For teachers and students: access to educational software – e-tools and applications.
- Access to software applications – demos as well as access to full applications – to help local governments improve transparency, responsiveness and efficiency.

Figure A illustrates the network's organization. It uses a wholesale/retail approach – where services can be developed in one place and distributed via the network to business-run nodes down to very small towns.

At the "wholesale level," the ***Network Hub*** is a business entity which creates service offerings -- some of which are already available from current USAID projects, e.g., training from the e-Biz Online Training Center; e-government and educational applications. Figure A also shows the workforce development (WFD) activities recommended in this report in section IV.C, below. Other services are from schools, universities and private companies in Macedonia and beyond.

All of these resources are made available to the "retail level" via the Worldwide Opportunity Network's local e-Centers throughout Macedonia. The "Opportunity" or "e-Centers" provide access to the entire range of services using everything from video-conferencing to the Web, DVDs and email. These e-Centers:

- Are linked to the network "hub" via a business relationship that monitors quality and customer service and rewards entrepreneurship and selling services. This may be a franchise model or some other business model.
- Build on (and pay for) broadband Internet access provided by the Macedonia Connects network vendor.
- Offer some free services but mostly services on a fee basis.
- Provide access to information on job and business opportunities within Macedonia and beyond; online training needed to take advantage of the job and business opportunities; e-coaching and other "virtual" services

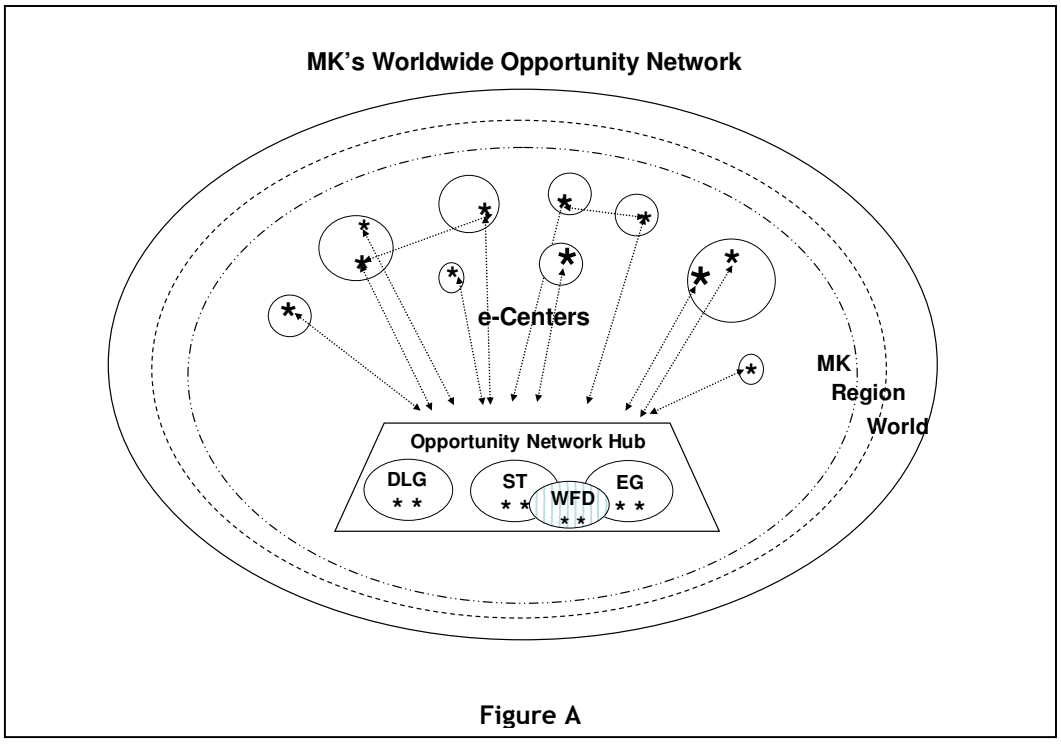

Figure A

Demand for the network's services is maximized by:

- The network's focus on meeting the major demand in Macedonia: the need for jobs and business opportunities. Once e-Centers demonstrate they have helped people find jobs and start and grow successful businesses, demand for their services will grow quickly.
- A top notch, on-going multi-media campaign to publicize concrete successes and the opportunities e-centers offer.
- Incentives for e-Center owners to understand and market *to their local market* -- government, schools, businesses and citizens.
- The Network's responsiveness to demand of school and government users for training and access to new e-tools and applications and other e-services.
- The network's use competitions to reward those who use the network productively and in innovative ways.

B. Telecommunications Legal and Regulatory Environment

These recommendations are prerequisites for all the other recommendations to be successful.

- **Use systematic, persistent efforts to ensure that the new law and related regulations are implemented as intended to promote open competition**. Full implementation of the new law is essential to progress in all other aspects of the use of ICT for development. USAID can have a critical impact in key areas, e.g., formulation of the necessary bylaws, establishment of an independent regulatory body, identifying appropriate commissioners. To ensure progress is made, it will be important to utilize monitoring and evaluation measures.
- **Work closely with other donors**. The importance of donor coordination and collaboration was demonstrated in the successful elimination of problematic amendments proposed while Parliament considered the new law. USAID's leadership role, and ongoing collaboration among the donors, continues to be key to the successful implementation of the law. It will also be important in encouraging the government to take a leadership role in implementing appropriate Information Society plans.
- **Provide capacity-building for a new regulatory agency**. USAID can provide training to the regulatory agency, once it is established to be independent of MOTC, via such programs as the U.S. Telecommunications Training Institute (USTTI). A peer mentoring activity might also be useful, matching up new commissioners and agency staff with able peers in comparable countries in the region or beyond.

C. Economic Growth and ICT

All of these recommendations build on USAID's exceptional track record of using ICT to strengthen SMEs and promote economic growth. They also can take full advantage of and build upon the Worldwide Opportunity Network recommended above.

- **Build on the successes of e-BIZ and MCA, and link those initiatives more closely.** MCA and the e-BIZ project have complemented one another in target sectors: MCA provides general management support (marketing, sales, financial managements, etc.) to business clusters while e-BIZ provides access to ICT services, along with selected business

management support, that significantly strengthen business competitiveness. This approach provides a powerful new model for promoting competitiveness. It would be well worth expanding the use of ICT to strengthen additional sectors, one of the most important of which is agriculture. It will also be important to expand application of the e-BIZ approach (partnering with entrepreneurs who co-invest) to make the high impact ICT services available throughout the country, down to rural areas.

- **Use ICT to support development of a modern, competitive workforce.** Create a self-sustaining approach to bridge the gap between individual workers, the education system, commercial training, and the business community and take full advantage of ICT approaches for e-learning and partnerships across sectors within Macedonian and across borders. The approach should be able to identify and keep abreast of the market for skill sets that will make Macedonia competitive; provide access to education and training opportunities to build those skills; help develop standards for training programs; foster communication between government, education, and business, and link those sectors with their peers in other countries.

- **Ensure transparent government procurement.** The government will continue to be a major customer for IT products and services. Ensuring a transparent procurement process at all levels of government can model the use of ICT for other sectors, and support development of ICT offerings in which Macedonia can have a competitive edge. It can also attract foreign direct investment

- **Encourage the Government of Macedonia to provide leadership and support initiatives that take advantage of ICT to build export capacity, attract FDI, and generate jobs.** Macedonia has many opportunities to use ICT to develop competitive industries, e.g., shoe manufacturing and apparel manufacturing using CAD/CAM, use of the Internet to promote tourism, IT outsourcing and software development. For these areas, and others that use ICT to improve competitiveness, to prosper, it will be important to encourage the GOM to help promote Macedonia among foreign investors.

- **Use ICT to build broad-based business management skills.** Use ICT in a broad campaign to improve all types of management skills, and to build capacity to use ICT in management. The campaign could cover virtually all industries from engineering to food processing. For example: increase access to the e-BIZ Online Management Training Center courses, provide e-mentoring opportunities, foster online networking with peer companies and associations.

D. Social Transition and ICT

These recommendations build on USAID's outstanding "ICT for education" projects, and address key areas of opportunities for using ICT to improve teaching and learning in school, and lifelong learning after formal schooling. They also can take full advantage of and build upon the Worldwide Opportunity Network recommended above.

- **Improve links between education and the business community.** Provide teachers, administration, and students with more systematic means to stay abreast of demand for ICT skills both domestically and internationally (the latter to help Macedonian businesses become more competitive internationally) and to interact regularly with the business community. Use ICT to help graduating students to obtain career counseling that is based on knowledgeable expertise and is tightly tied to concrete opportunities in both ICT and

non-ICT industries (avoid the pitfall of having career counselors in schools who have little knowledge of the real-world requirements and opportunities). Use ICT to provide the same career counseling opportunities to those who are out of school, especially the unemployed or underemployed. Urge the business community to engage with the education systems, e.g., MASIT could have an "education" segment in their conferences, business experts could be guest lecturers, etc.

- **Support access to and effective use of ICT applications for active learning and local content**. Build on e-Schools, Macedonia Connects, and the "modernize teaching methods" projects to provide access to the wide variety of software available at a range of prices, which teachers can use to enhance and enliven their teaching and to create content in local languages. This effort can make much progress without having to revise the curricula, which will be a much longer-term effort. Some applications, for lower grades, do not require language; others – especially open source applications – make it easy to produce materials in Macedonia. It will also be worthwhile to foster stronger ties between schools, the IT business community and relevant university departments, which can produce education materials in Macedonian, e.g., using open source software. Appendix C provides some useful sources of information. Incumbent teachers for all grades can be motivated to use new ICT tools to improve the learning experience in their classes, e.g., encourage university faculty to partner with teachers to introduce new ICT applications and effective ways to use them; highlight "success stories" of innovative teachers; hold contests for creative use of ICT in non-ICT courses, etc.
- **Link faculty with each other and the world.** Use ICT to create "communities of practice" among Macedonian teachers, e.g., via moderated online discussions, as well as to link teachers with progressive teaching communities in other countries, e.g., to understand the kinds of standards being used elsewhere. ICT can also provide e-mentoring opportunities, in which Macedonian teachers pair with progressive teachers elsewhere, and share experiences, tips, and materials. Similarly, it is important to promote collaboration among the faculty at the three Macedonian universities, as well as to support professional linkages between Macedonian university faculty and faculty of universities in other countries. High-speed links are essential to enable sharing of large files, videoconferencing, online professional development opportunities.
- **Link students across ethnic groups and borders.** Promote use of ICT to bring together students of different ethnicities within Macedonia in collaborative online projects, e.g., students can co-create projects in which each group develops the materials in their own languages. Similarly, link Macedonian students with those in other countries, preferably in case-based learning situations in which the Macedonian students can provide "expertise" in their own culture.
- **Improve school administration and management.** The World Bank introduction of ICT to improve MOES management can be expanded to include schools – a step particularly important in light of decentralization. Also, some universities, e.g., the Informatics faculty of St. Cyril and Methodius, may already have developed applications that can easily be modified for use in the primary and secondary administration systems.

E. Democracy and Local Governance and ICT

These recommendations build on the leadership role of USAID's "ICT for improved governance" projects. As with recommendations in other sectors, they can take full advantage of and build upon the Worldwide Opportunity Network recommended above.

- **Strengthen ability of local governments to use ICT effectively.** Build awareness and capacity among local governments for effective uses of ICT to improve governance: (1) introduce e-government as part of essential "customer-oriented" responsiveness that respects privacy and freedom of information; (2) raise awareness of the e-government applications available (especially via the Macedonia Connects broadband network) and the resources required to deploy and *maintain* them, and the pitfalls and guidelines for success related to each application; (2) build capacity for development and implementation of an ICT strategy through training and technical assistance, including online training offered by the e-BIZ Online Training Center, e-mentoring that links up local government officials with experts-at-a-distance, online networking among local governments in Macedonia and with experienced e-government entities in the region, US and EU.

- **Encourage local governments to initiate innovative ICT applications.** Provide incentives for local governments to use ICT to improve their services to businesses, schools and individuals. One approach is to hold competitions among local governments for funds to provide innovative customer-facing e-government applications, and/or innovative partnerships with the private sector to deliver e-services. Another is to identify progressive local governments that have independently initiated innovative e-government applications, and provide non-financial rewards, e.g., training (face-to-face and online), publicly awarded recognition for "outstanding municipalities," travel to conferences, etc.
- **Link local governments with IT business community and the education community.** Build strong links between local governments, IT companies (e.g., the MASIT task force on e-government), and e-BIZ Centers, in order to provide and support e-government applications (including locally-developed Open Source applications), strengthen IT companies' ability to understand and serve the needs of local governments, and offer new economic opportunities at the local level. Also, build links between local governments and VET secondary schools and universities – to provide internship opportunities for students and consulting opportunities for university faculty, e.g., of the SEEU e-BIZ Center.
- **Help build a critical mass of good quality e-government services.** Develop a resource of "vetted" e-government applications that are effective and appropriate for Macedonian local governments. Disseminate information about the applications and encourage their adoption by local governments. Raise awareness among businesses and citizens to generate support for and use of e-government applications.
- **Work with other donors to encourage national-local government networks in key application areas.** Several donor initiatives aim to use ICT to improve government performance in key areas at national and/or local levels. It will be valuable to ensure ongoing coordination with those donors so that there is the requisite connectivity between national and local governments, as well as resources for training, operations improvement, plans for installation and maintenance at the local level, and sharing of best practices.

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B. KEY REFERENCE DOCUMENTS

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C. Some Resources related to Open Source Software for Education

There are myriad open source applications available for educational use. The following are a few resources to begin to explore the possibilities.

1. A meta-site on free software for schools from UNESCO with many lots of tools and actual applications http://www.unesco.org/webworld/portal_freesoft/Software/Courseware_Tools/

2. Two other meta-sites with useful links and references: http://www.schoolforge.net/ and http://opensourceschools.org/

3. This site www.tomsnyder.com provides descriptions of many widely used proprietary educational software applications which may provide Macedonian educators with ideas for priority applications and tools for developing teaching material that might be useful to have in Macedonia's languages.